Internal Multi-fold Unit FD3000
Machine Code: M482
Field Service Manual
Ver 1.0

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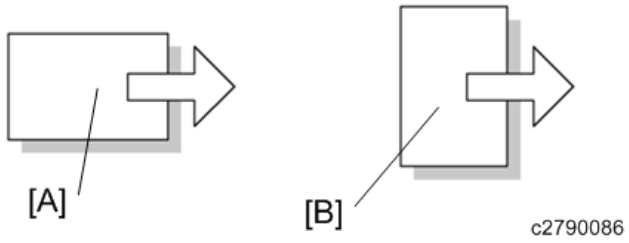
Symbols, Abbreviations and Trademarks

Symbols, Abbreviations

This manual uses several symbols and abbreviations. The meaning of those symbols and abbreviations are as follows:

Symbol	What it means
	Clip ring
	Screw
	Connector
	Clamp
	E-ring
	Flat Flexible Cable
	Timing Belt
SEF	Short Edge Feed
LEF	Long Edge Feed
K	Black
C	Cyan
M	Magenta
Y	Yellow
B/W, BW	Black and White
FC	Full color



[A] Short Edge Feed (SEF)

[B] Long Edge Feed (LEF)

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Microsoft® Windows Server® 2012 R2 Standard

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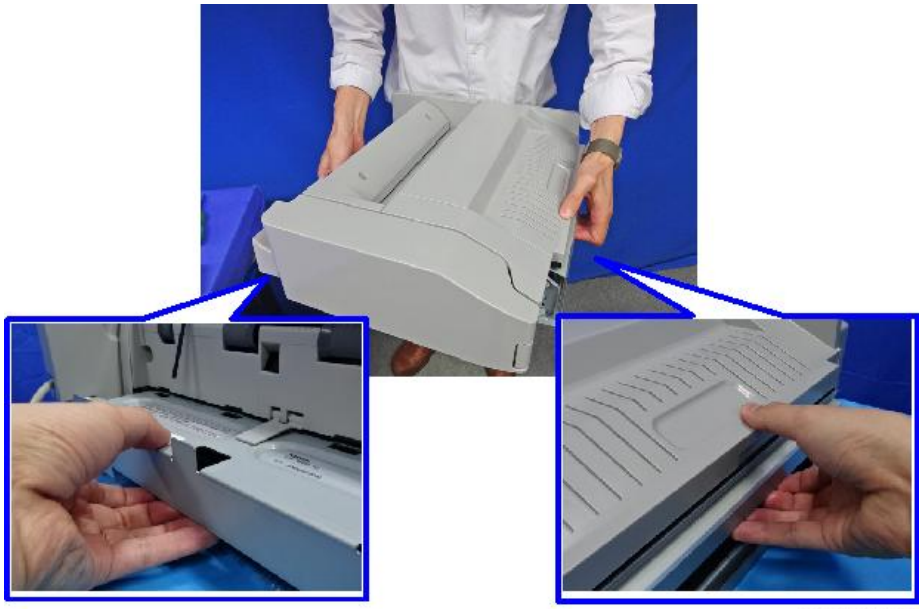
1. Replacement and Adjustment

How to Hold the Internal Multi-folding Unit

⚠CAUTION

When lifting the internal multi-folding unit, be sure to hold the side frames, as shown in the image below. Holding the exterior or other parts might damage or deform the unit.

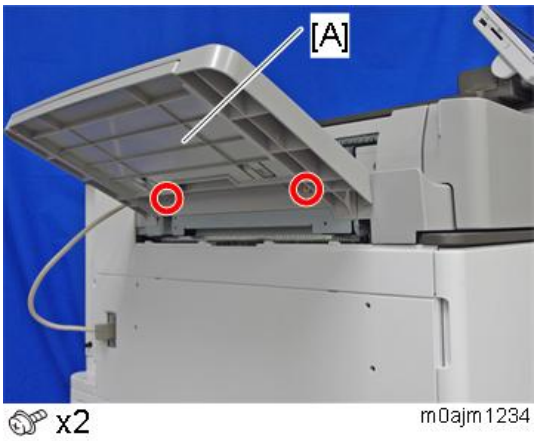


Removing the Internal Multi-fold Unit

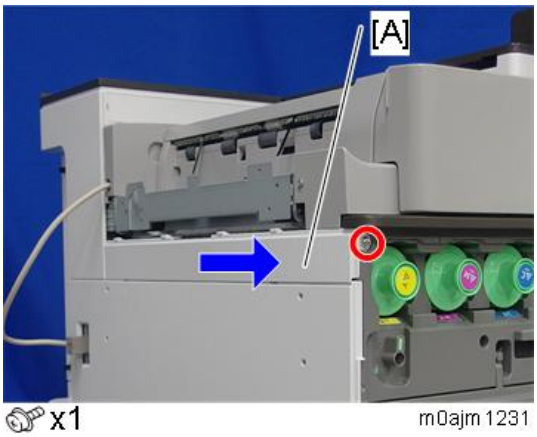
1. When a finisher is connected, first remove the finisher and then proceed to step 3.

2. When no finisher is connected, perform the following steps.

1. Remove the paper exit tray [A].



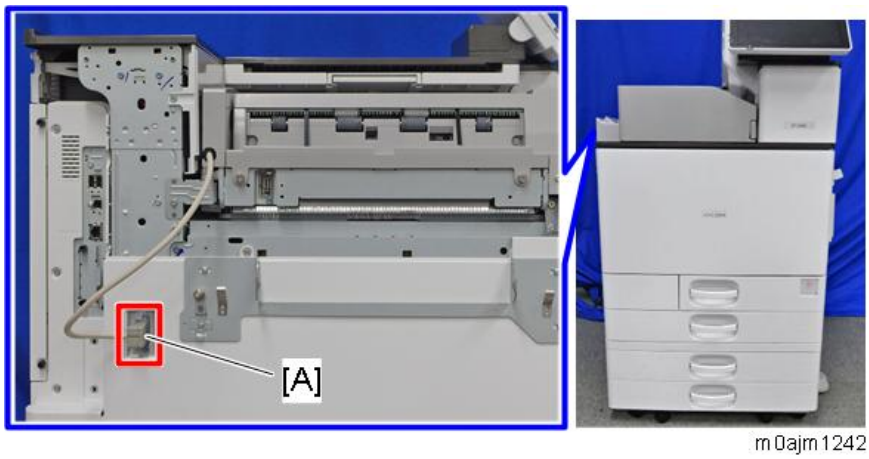
2. Open the front cover, and then remove the left upper cover [A].
   Slide the cover in the direction of the blue arrow.



3. Remove the left rear cover [A].

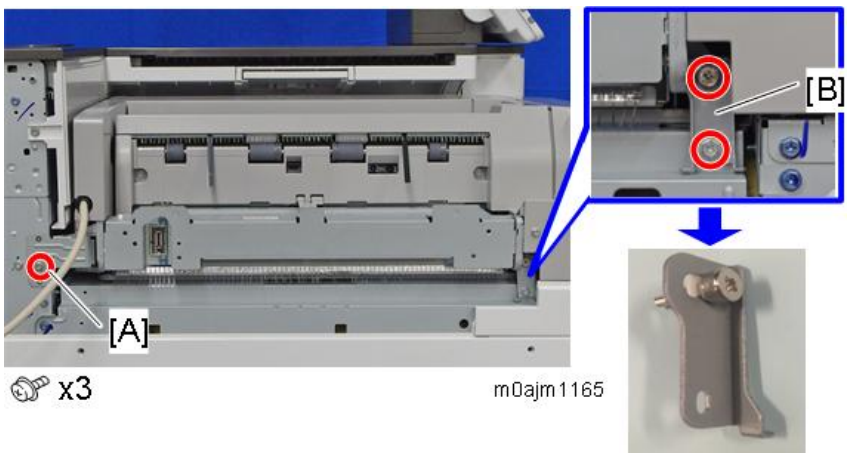
4. Open the door [A] and remove the coin screw [B].

5. Disconnect the connector [A].



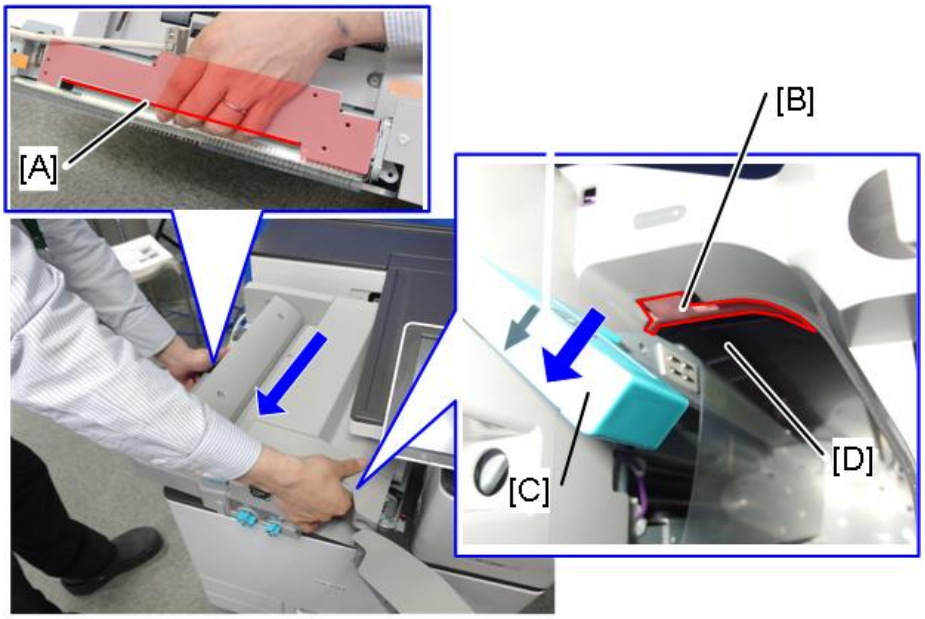
6. Remove the fixing screw [A] and bracket [B].

When removing the bracket [B], remove the top screw first, and then the bottom one.



7. Open the front cover of the internal multi-fold unit, and then, holding the exit tray frame [A] and the top part of the opening [B], lift the internal multi-fold unit and remove it.

- Lower the lever [C] to keep the paper guide plate open during operation, because the plate might be deformed if a strong force is applied while the guide plate is closed.
- Hold the metal frame part [B], not the exterior cover, to avoid damaging the cover.
- Be careful not to touch the mylar sheet [D] located behind.



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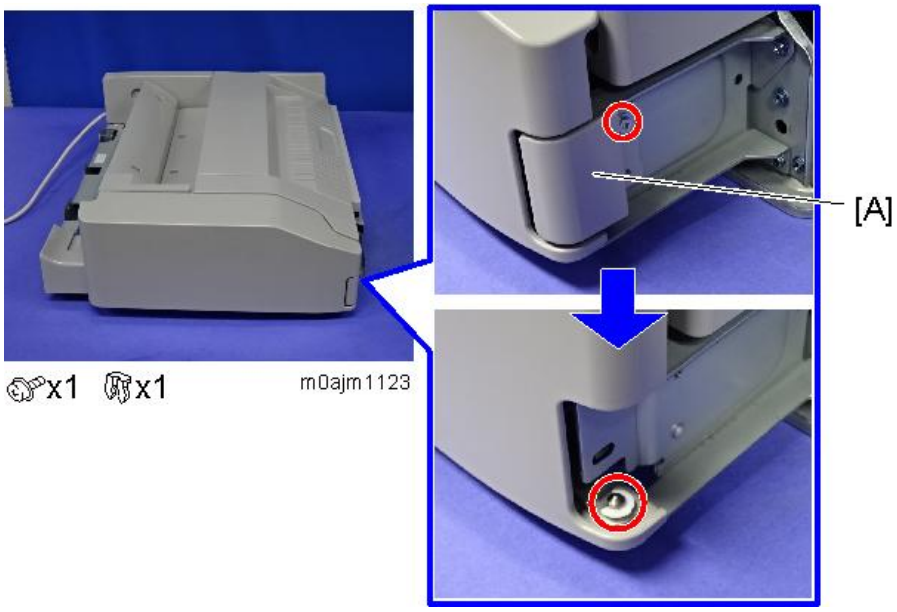
Exterior Covers

Rear Cover

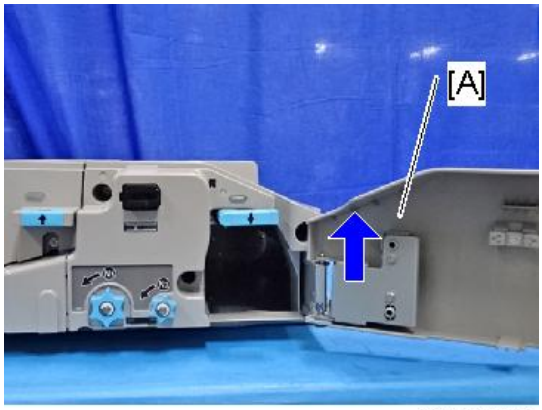
1. Remove the rear cover [A].

Door

1. Remove the small cover [A] and clip ring.



2. Open the door [A] and remove it by sliding upward.



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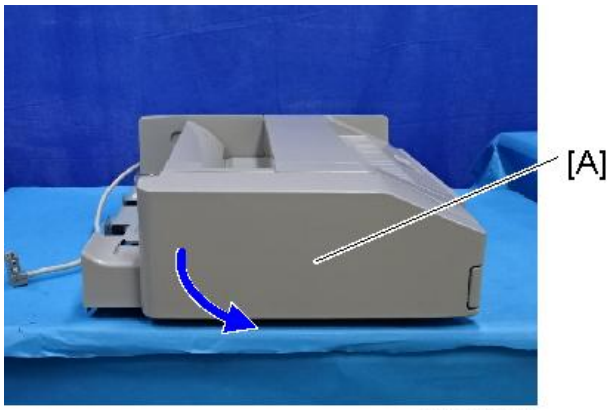
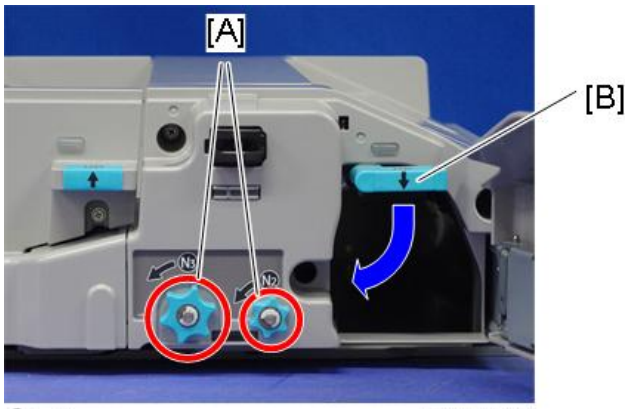
Front Right Cover

1. Open the door [A].



m0ajm1118

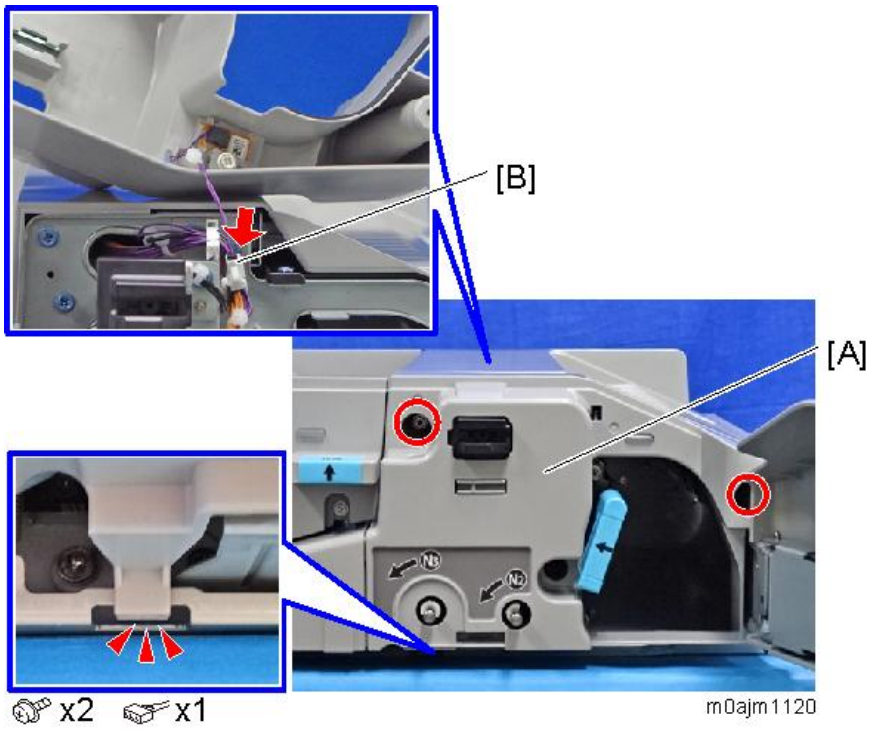
2. Remove the knobs [A], and then lower the lever [B].



x2 m0ajm1119

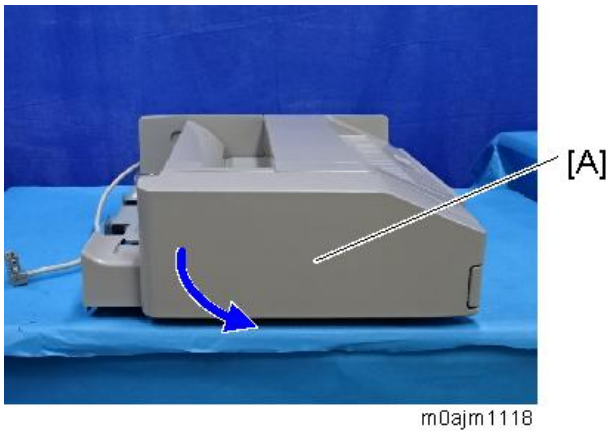
3. Remove the front right cover [A].

Remove the connector [B] connected to the LED on the back of the cover.

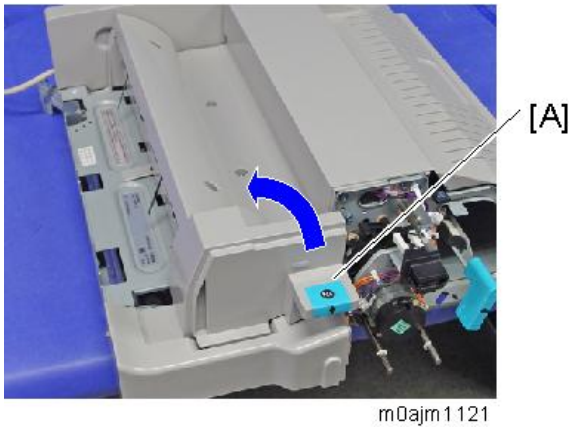


Front Left Cover

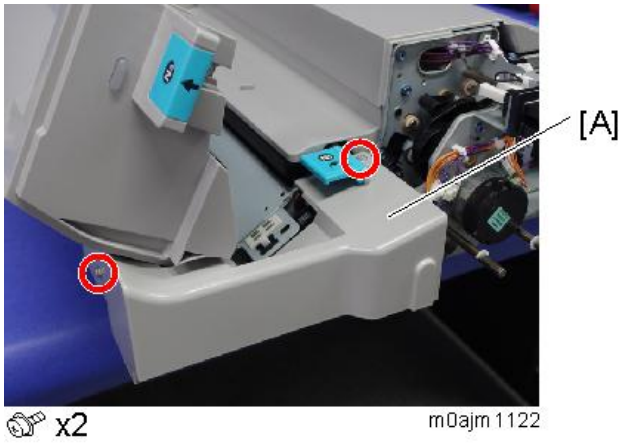
1. Open the door [A].



2. Open the exit unit [A].



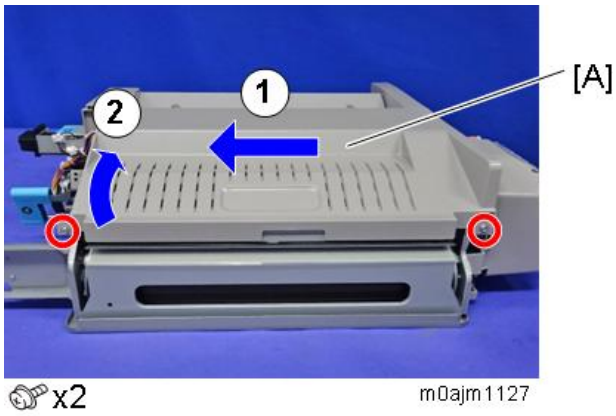
3. Remove the front left cover [A].



Top Cover

1. Remove the front right cover. (Front Right Cover)

2. Slide the top cover [A] to the left, turn the left side, and then remove the cover.

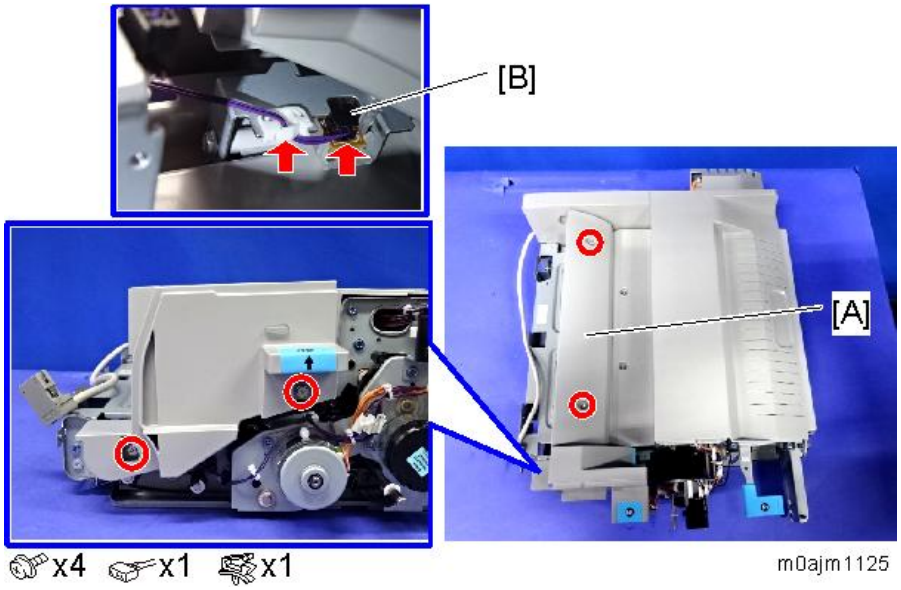


Exit Unit Cover

1. Remove the front left cover. (Front Left Cover)

2. Remove the exit unit cover [A].

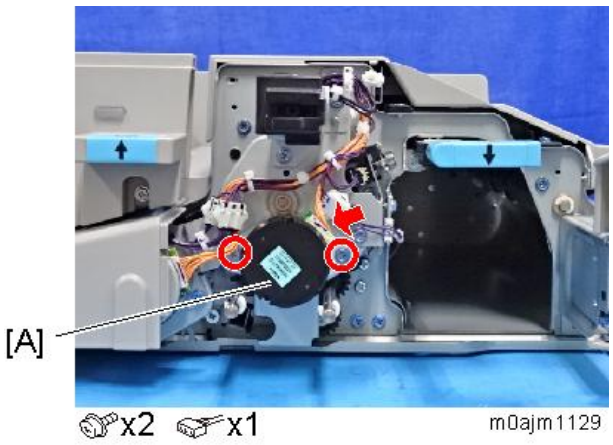
Disconnect the connector and open the clamp for the LED [B] on the back of the cover.


[B]
[A]
x4
x1
x1
m0ajm1125

Motors, Solenoid

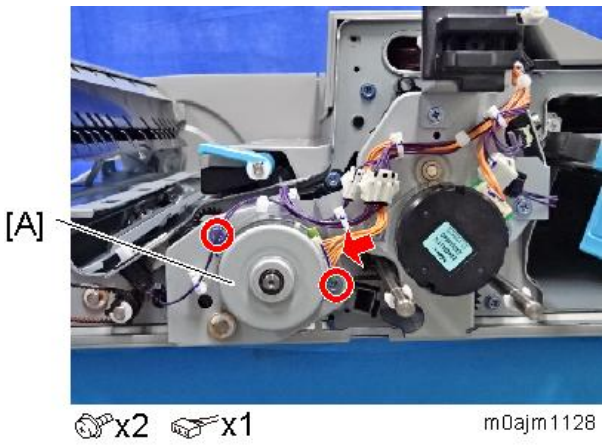
JG Crease Motor

1. Remove the front right cover. (Front Right Cover)
2. Remove the JG crease motor [A].



Transport Motor

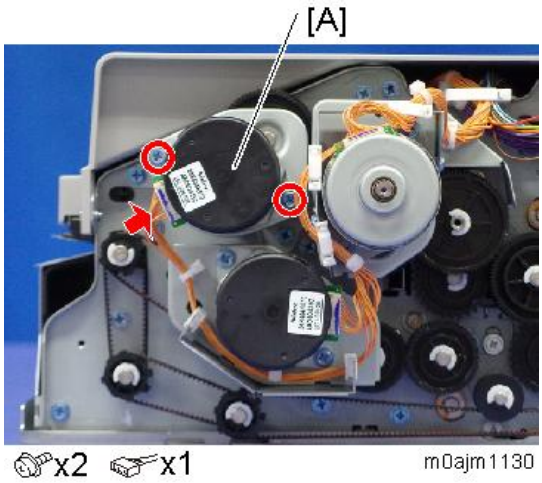
1. Remove the front right cover. (Front Right Cover)
2. Remove the front left cover. (Front Left Cover)
3. Remove the transport motor [A].



Registration Motor

1. Remove the rear cover. (Rear Cover)

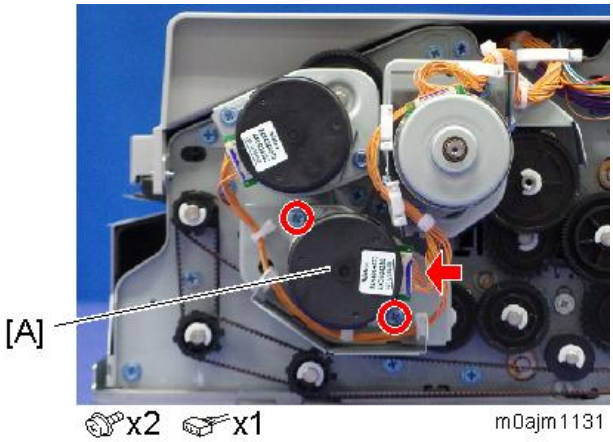
2. Remove the registration motor [A].



2nd Fold Motor

1. Remove the rear cover. (Rear Cover)

2. Remove the 2nd fold motor [A]



1st Fold Motor

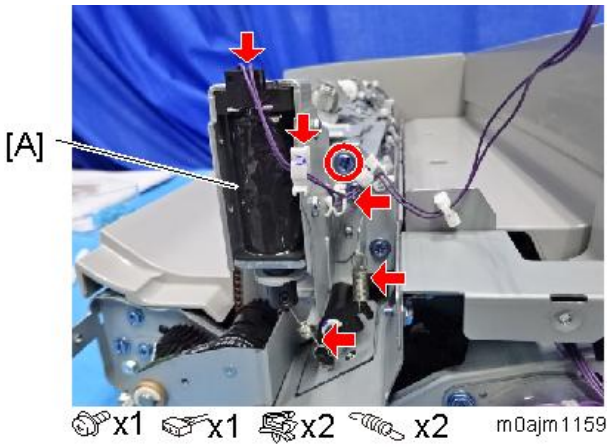
1. Remove the rear cover. (Rear Cover)

2. Remove the 1st fold motor [A].

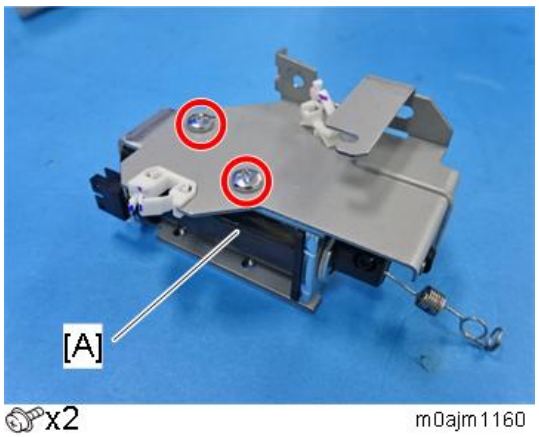
Junction Gate Solenoid

1. Remove the exit unit cover. (Exit Unit Cover)

2. Remove the junction gate solenoid unit [A].



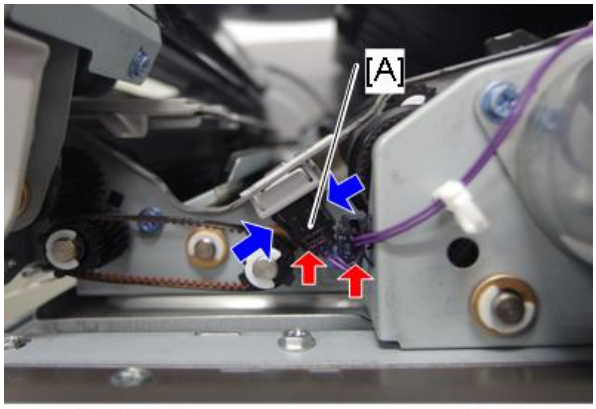
3. Remove the junction gate solenoid [A].



Switches

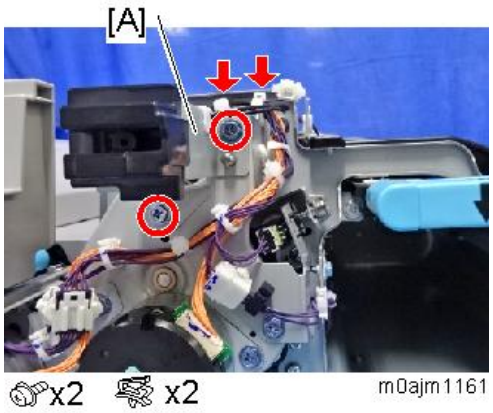
Exit Unit Switch

1. Remove the front left cover. (Front Left Cover)
2. Remove the exit unit switch [A].

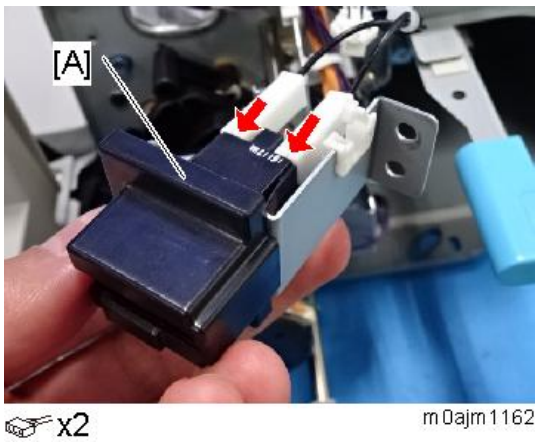


Front Door Switch

1. Remove the front right cover. (Front Right Cover)
2. Remove the front door switch bracket [A].



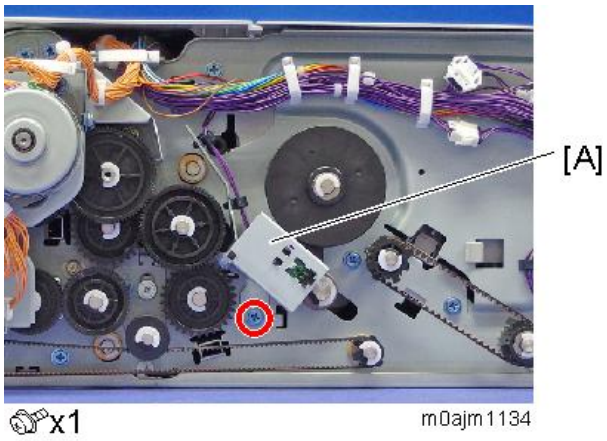
3. Remove the front door switch [A].



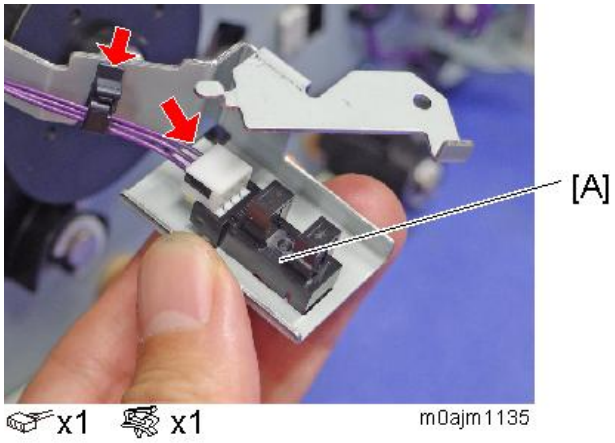
Sensors

Crease HP Sensor

1. Remove the rear cover. (Rear Cover)
2. Remove the crease HP sensor bracket [A].



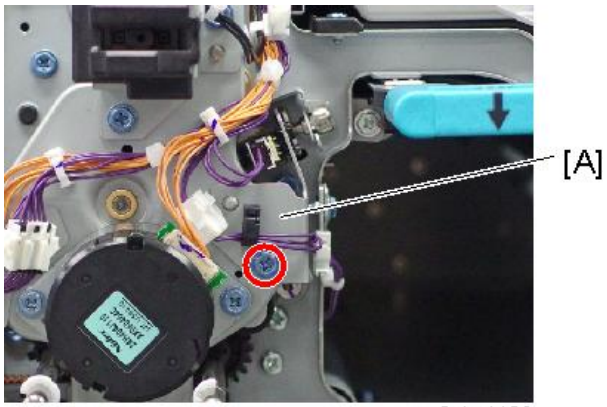
3. Remove the crease HP sensor [A].



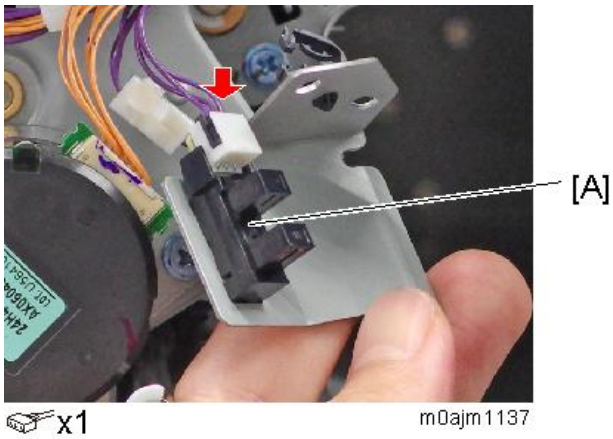
Junction Gate HP Sensor

1. Remove the front right cover. (Front Right Cover)

2. Remove the junction gate HP sensor bracket [A].



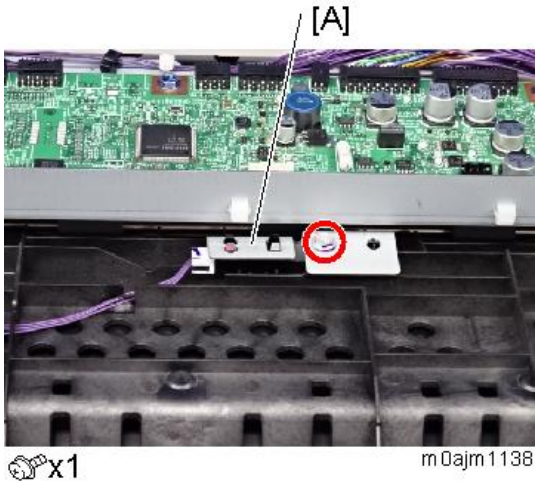
3. Remove the junction gate HP sensor [A].



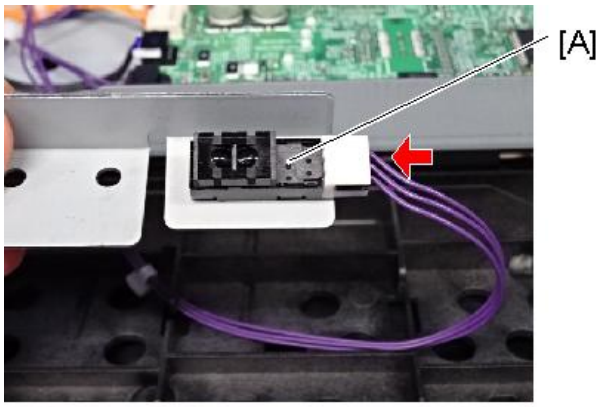
Registration Sensor

1. Remove the top cover. (Top Cover)

2. Remove the registration sensor bracket [A].



3. Remove the registration sensor [A].

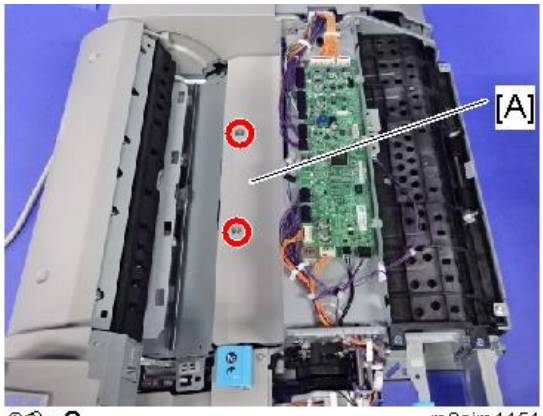


x1 m0ajm1139

Crease Sensor

1. Remove the top cover. (Top Cover)

2. Remove the N5 cover [A].

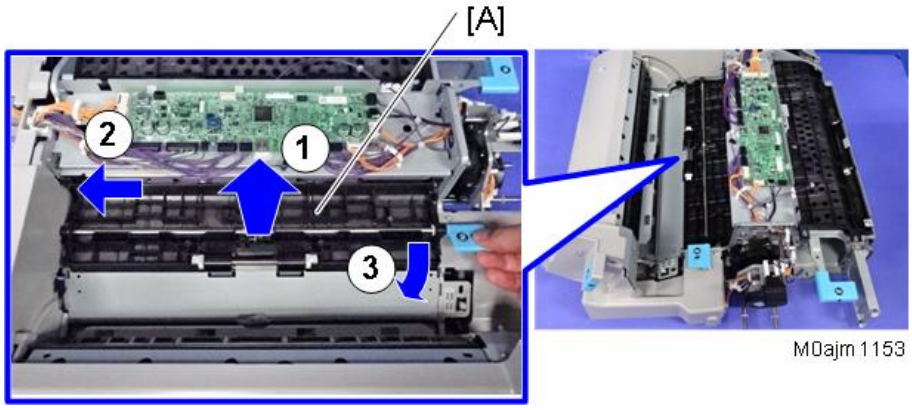


x2 m0ajm1151

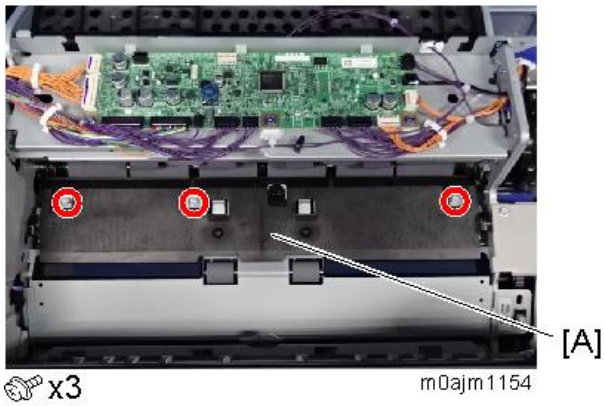
3. Remove the fixing plate [A].

x1 m0ajm1152

4. Lift the N5 cover [A], slide it to the left, and then remove it by pulling.

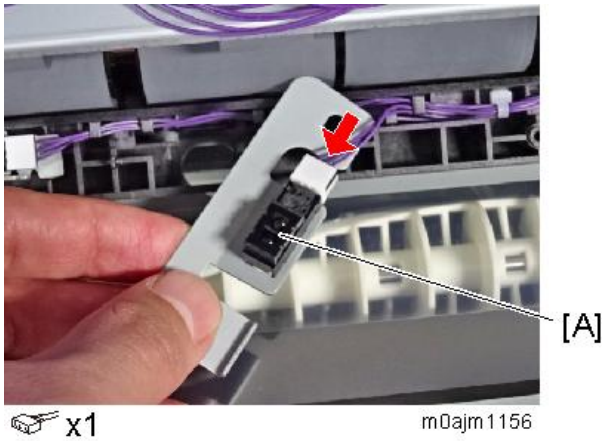


5. Remove the crease roller cover [A].



6. Remove the crease sensor bracket [A].

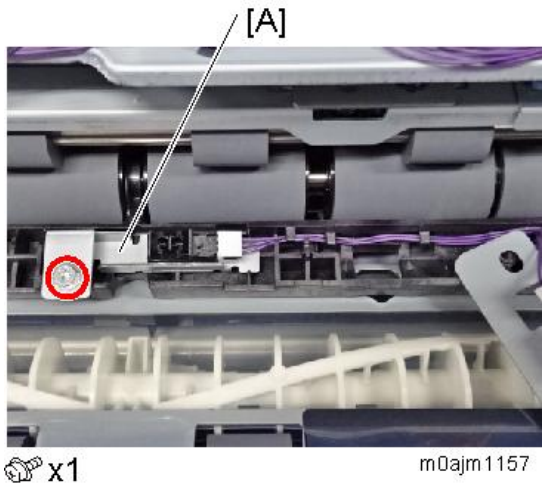
7. Remove the crease sensor [A].



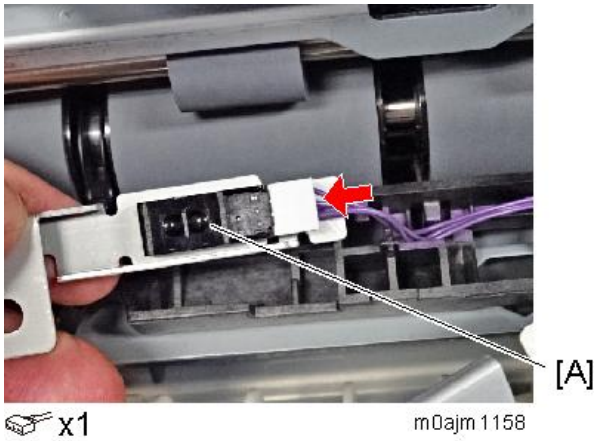
1st Fold Sensor

1. Remove the crease sensor bracket. (Crease Sensor)

2. Remove the 1st fold sensor bracket [A].

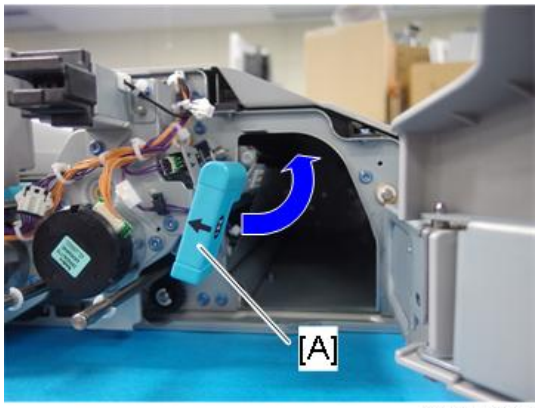


3. Remove the 1st fold sensor [A].



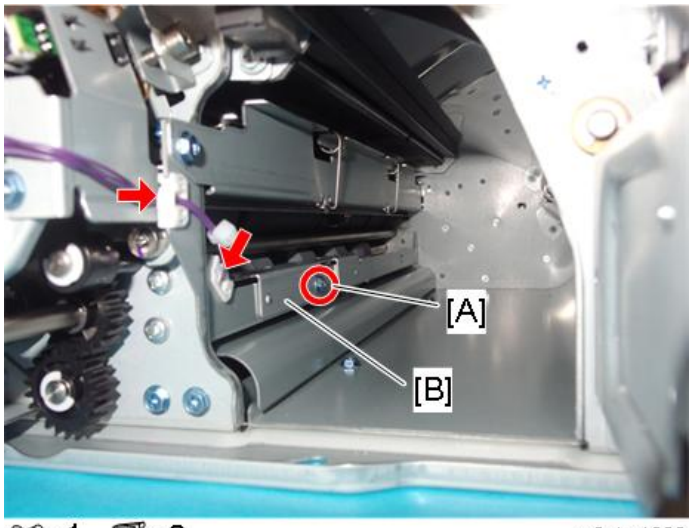
2nd Fold Sensor

1. Remove the front right cover. (Front Right Cover)
2. Raise the N1 lever [A].



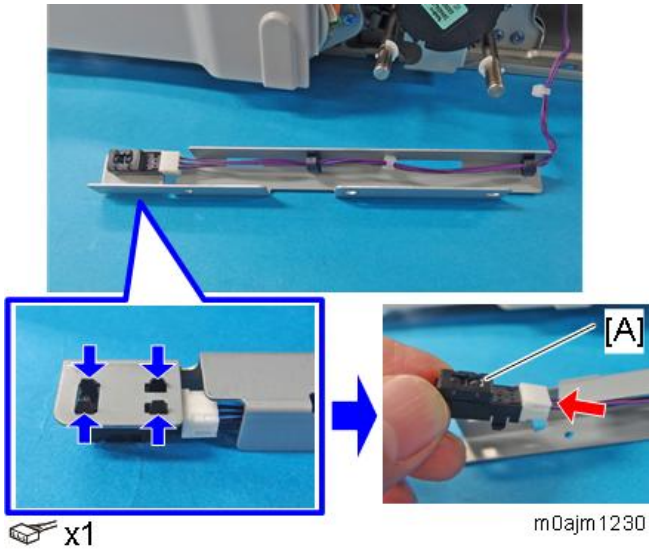
m0ajm1228

3. Remove the screw [A] with a short screwdriver, and remove the bracket [B].



x1 x2 m0ajm1229

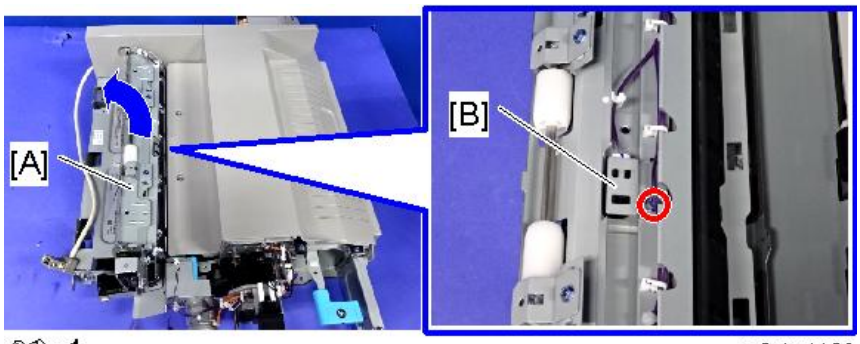
4. Remove the 2nd fold sensor [A].



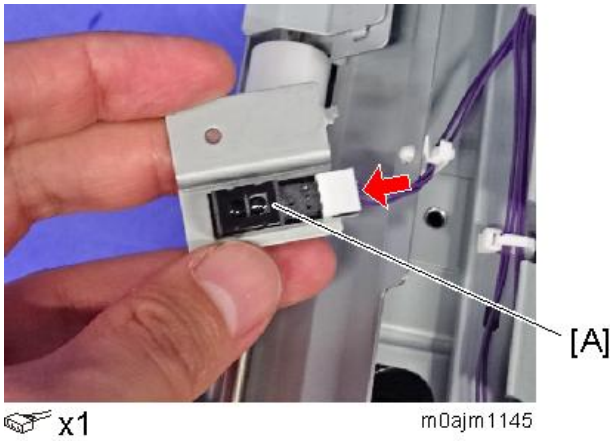
x1 m0ajm1230

Folder Tray Exit Sensor

1. Remove the exit unit cover. (Exit Unit Cover)
2. Raise the exit unit [A] and remove the folder tray exit sensor bracket [B].

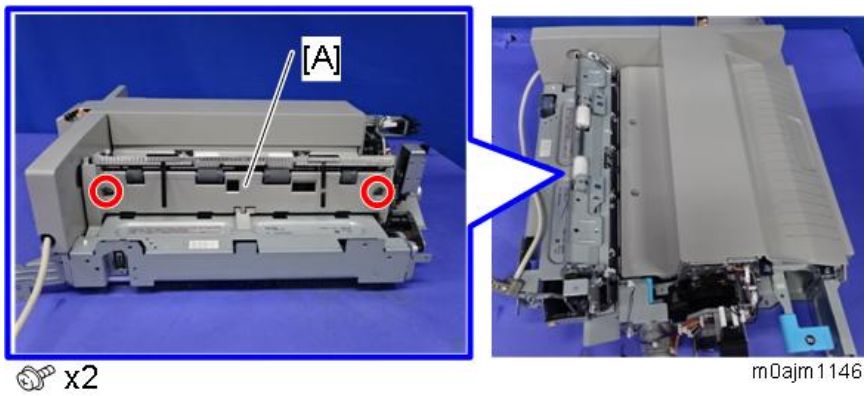


3. Remove the folder tray exit sensor [A].

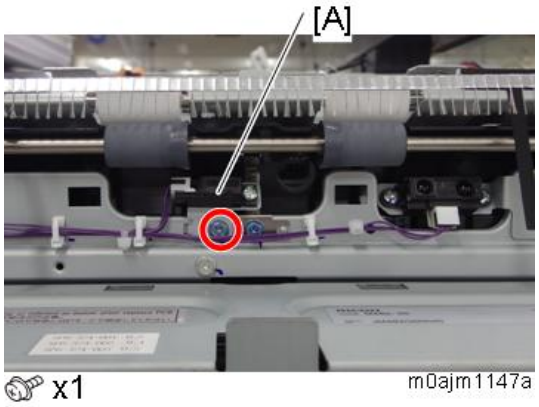


Folder Tray Full Sensor

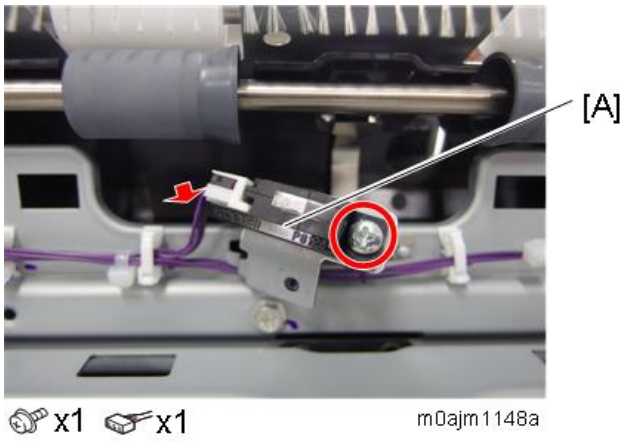
1. Remove the exit unit cover. (Exit Unit Cover)
2. Remove the exit fence [A].



3. Remove the folder tray full sensor bracket [A].



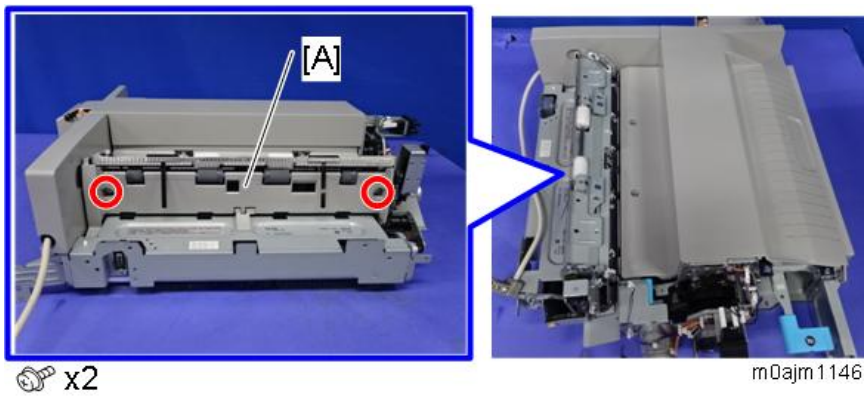
4. Remove the folder tray full sensor [A].



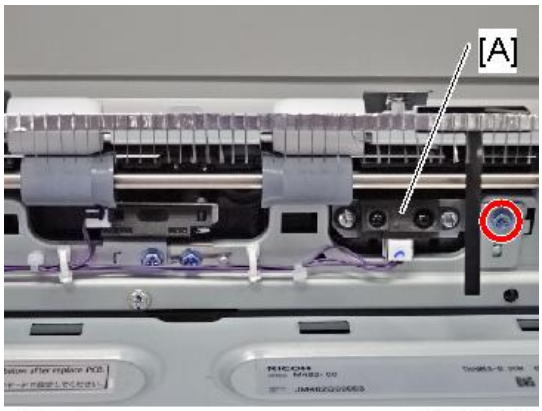
Folder Tray Full Sensor 2

1. Remove the exit unit cover. (Exit Unit Cover)

2. Remove the exit fence [A].

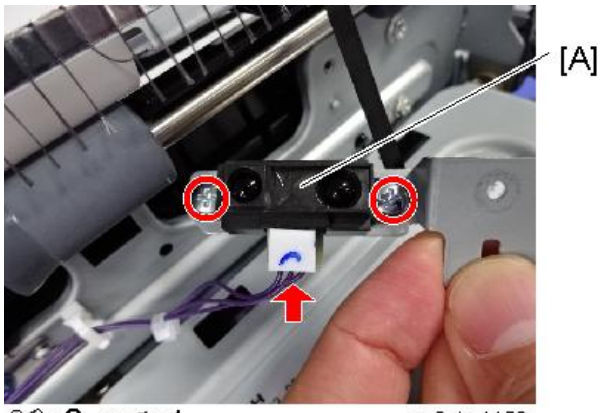


3. Remove the folder tray full sensor 2 bracket [A].



x1 m0ajm1149

4. Remove the folder tray full sensor 2 [A].



x2 x1 m0ajm1150

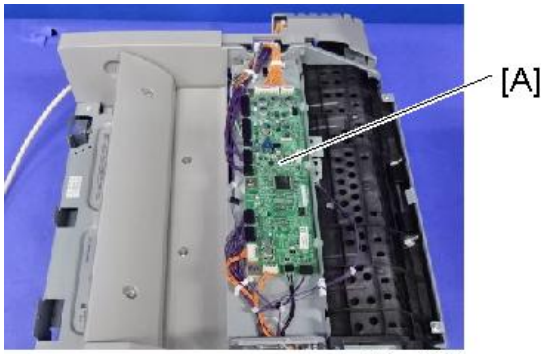
Horizontal Path Exit Sensor

1. Put the internal multi-fold unit upside down.

m0ajm1140

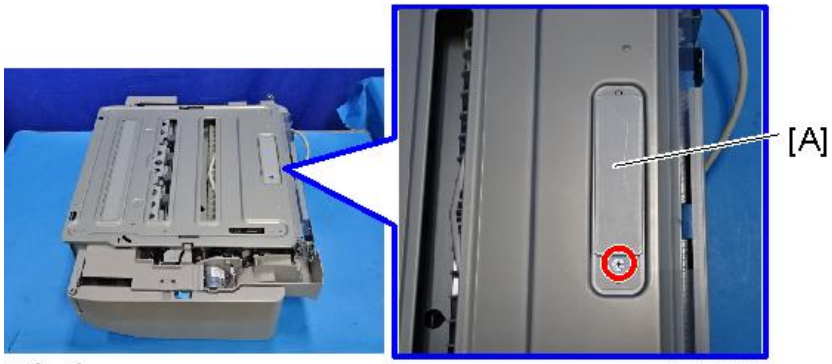
⚠CAUTION

Do not turn over the unit with the top cover removed, as shown in the image below, to avoid damage to the circuit board [A].



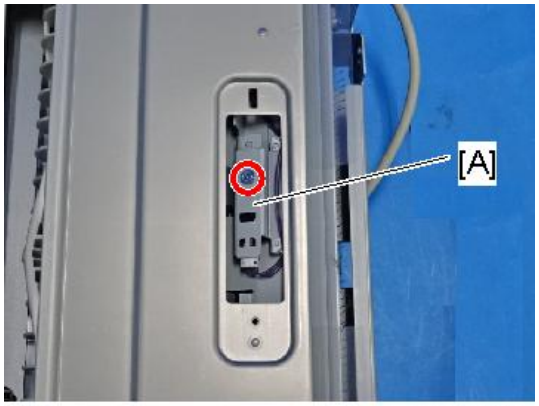
m0ajm1141

2. Remove the horizontal path exit sensor cover [A].



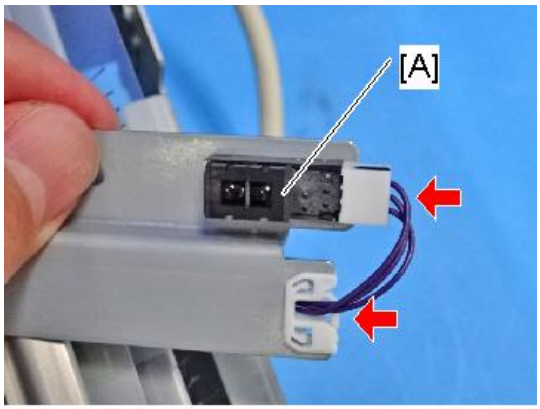
m0ajm1142

3. Remove the horizontal path exit sensor bracket [A].



m0ajm1143

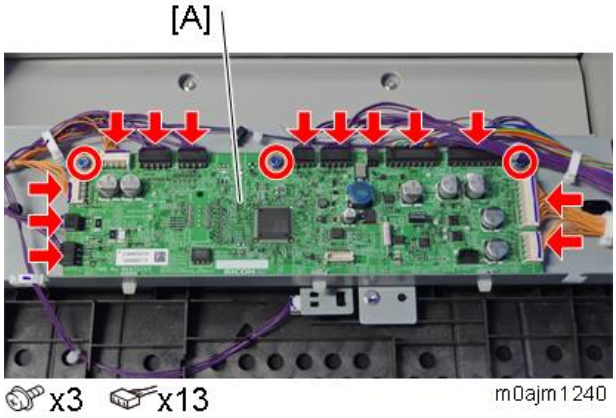
4. Remove the horizontal path exit sensor [A].



x1 x1 m0ajm1144

PCB

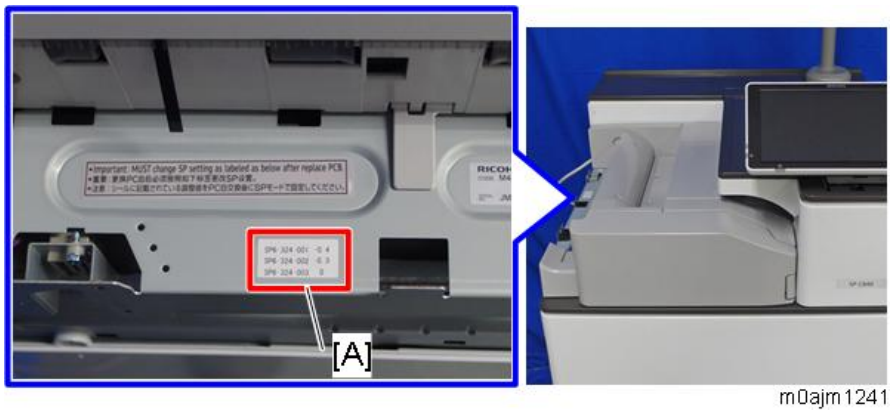
1. Remove the top cover. (Top Cover)
2. Remove the PCB [A].



What to do After Replacing the PCB

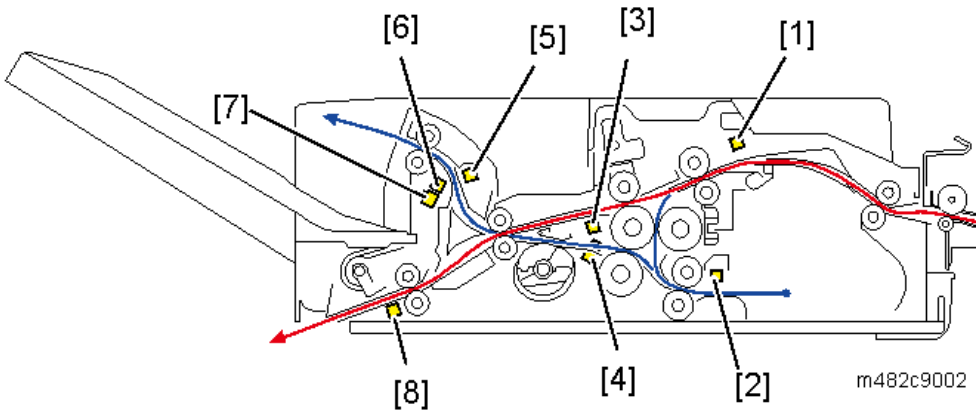
After replacing the PCB, set the unit to the adjustment values that are specified in the label [A] on the left frame, in the following SP modes.

- 6-324-001 (NV Adj. Data Mod. 1st Fold Pos. Factory Setting)
- 6-324-002 (NV Adj. Data Mod. 2nd Fold Pos. Factory Setting)
- 6-324-003 (NV Adj. Data Mod. Crease Pos. Factory Setting)



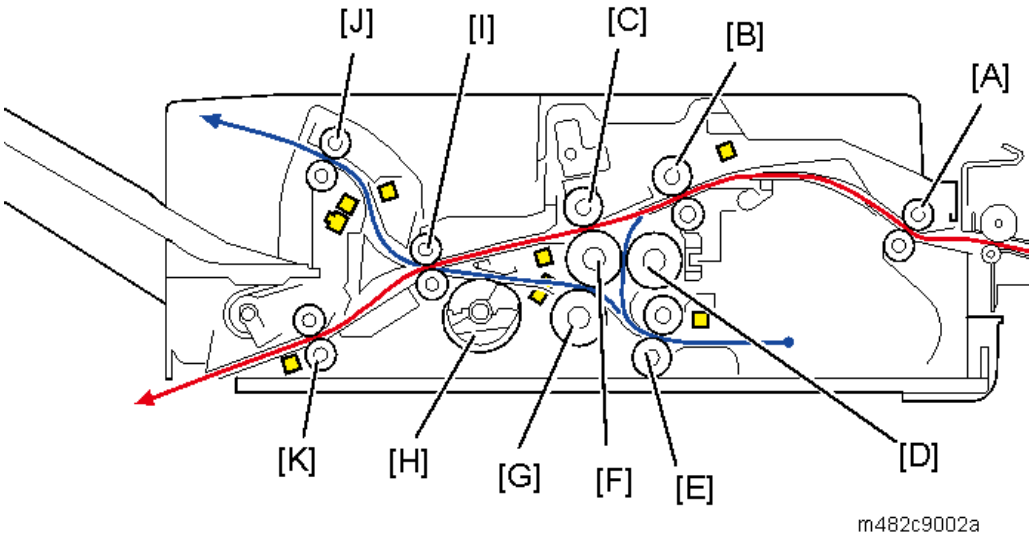
2. Detailed Descriptions

Sensor Layout



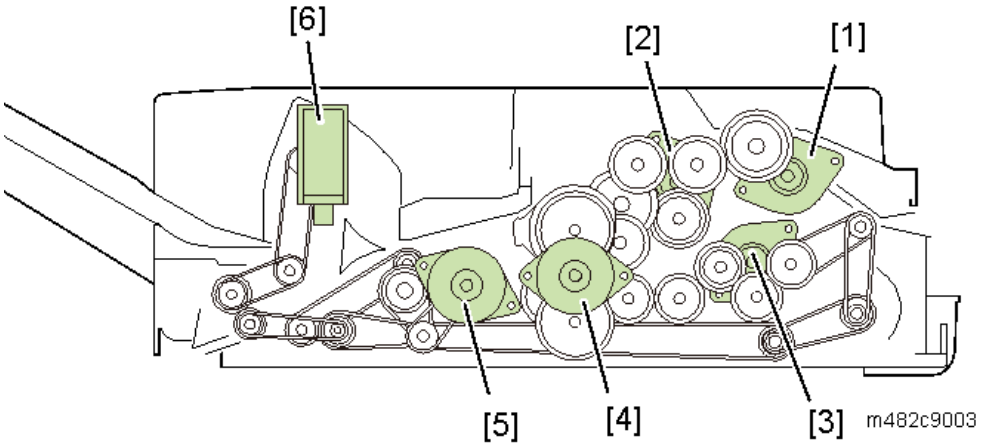
No.	Description	No.	Description
1	Registration sensor	5	Folder tray exit sensor
2	2nd fold sensor	6	Folder tray full sensor 1
3	1st fold sensor	7	Folder tray full sensor 2
4	Crease sensor	8	Horizontal path exit sensor

Roller Layout



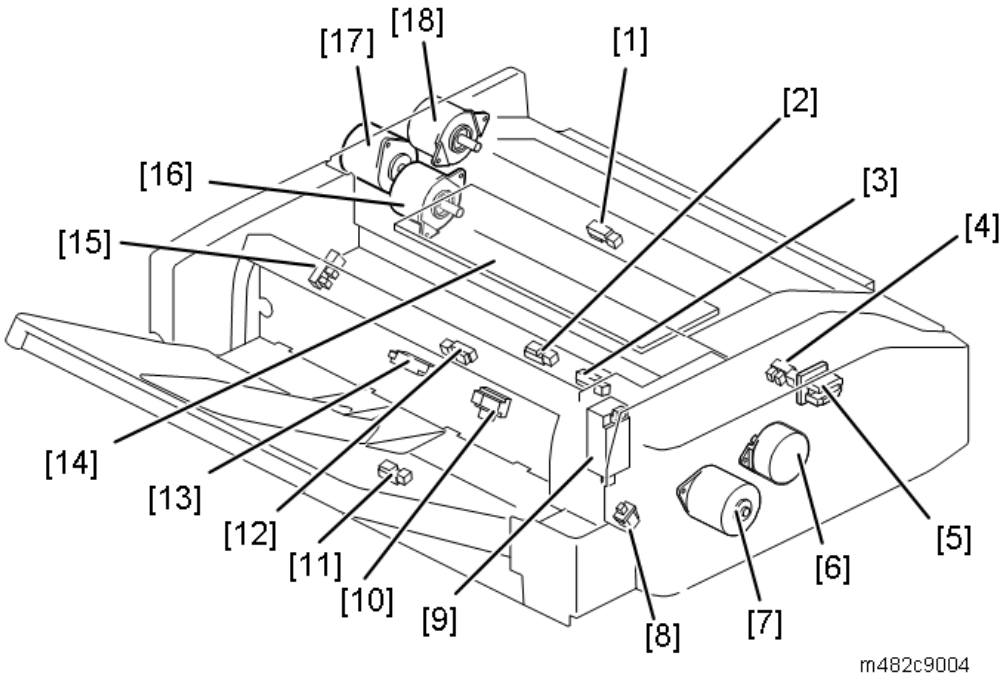
No.	Description	No.	Description
A	Paper entrance roller	G	Folding roller 3
B	Registration roller	H	Crease roller
C	1st fold roller (F/R)	I	Relay transport roller
D	Folding roller 1	J	Folder tray exit roller
E	2nd fold roller (F/R)	K	Horizontal path exit roller
F	Folding roller 2		

Drive Layout



No.	Description	No.	Description
1	Registration motor	4	JG crease motor
2	1st fold motor	5	Transport motor
3	2nd fold motor	6	Junction gate solenoid

Parts Layout



No.	Description	No.	Description
1	Registration sensor	10	Folder tray full sensor 2
2	1st fold sensor	11	Horizontal path exit sensor
3	Crease sensor	12	Folder tray exit sensor
4	Junction gate HP sensor	13	Folder tray full sensor 1
5	Front door open/closed switch	14	PCB
6	JG crease motor	15	Crease HP sensor
7	Transport motor	16	2nd fold motor
8	Exit unit switch	17	1st fold motor
9	Junction gate solenoid	18	Registration motor

Mechanism

Fold Types

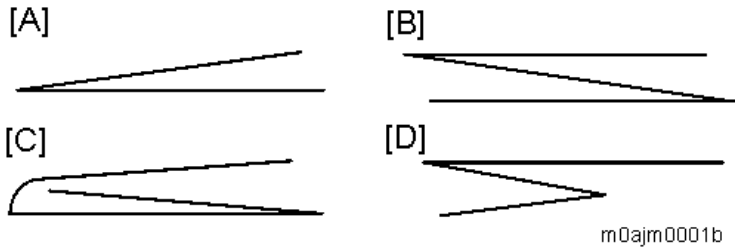
This unit is capable of the following fold types:

[A] : Half Fold

[B] : Letter Fold-out

[C] : Letter Fold-in

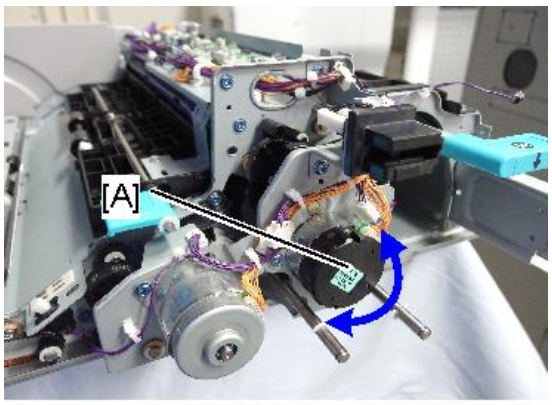
[D] : Z-fold



m0ajm0001b

Junction Gate / Crease Mechanism

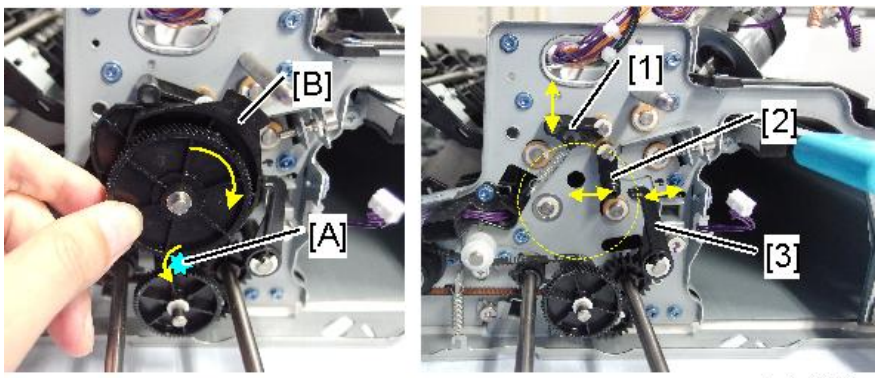
The JG crease motor [A] rotates clockwise/counterclockwise to operate the junction gate / crease roller.



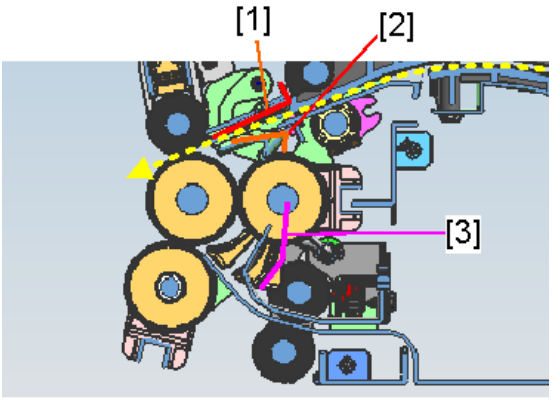
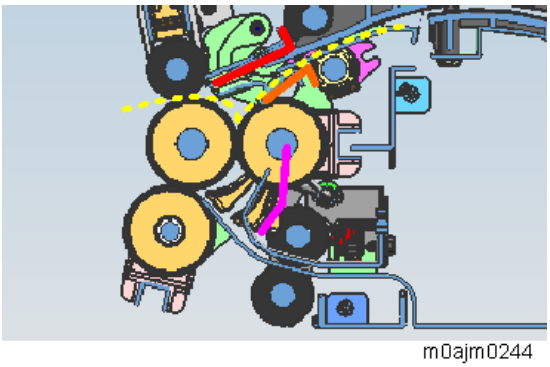
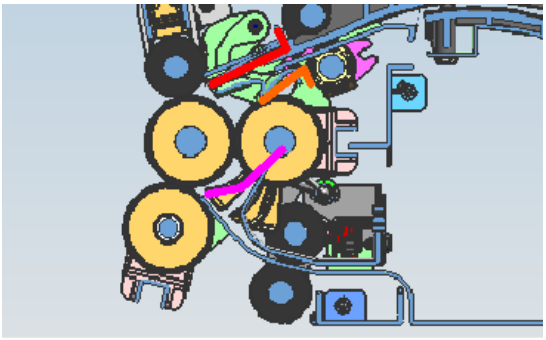
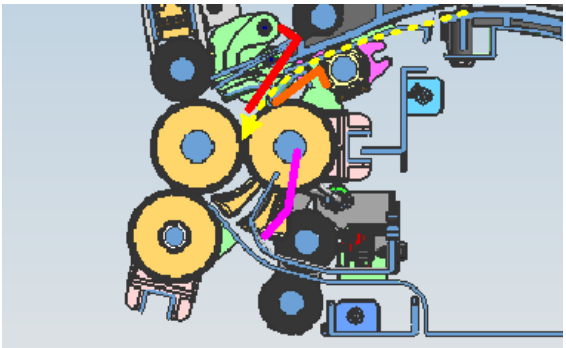
m0ajm0239

Junction Gate

- When the JG crease motor [A] rotates clockwise, the junction gates 1, 2, and 3 operate.
- The cam moves the levers 1, 2, and 3 to switch the corresponding junction gates on and off.

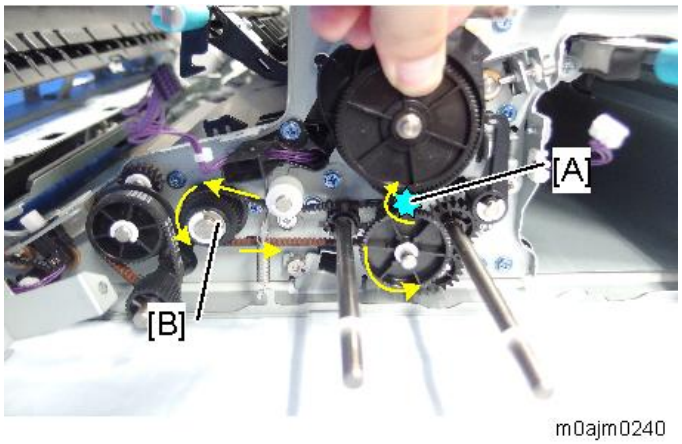


m0ajm0242a

Paper feeding	Junction Gate Status
When feeding paper without folding	 m0ajm0243 [1]: Junction Gate 1 [2]: Junction Gate 2 [3]: Junction Gate 3
When entering Folding Roller 1	 m0ajm0244
When adjusting the letter fold position	 m0ajm0245
When performing half fold	 m0ajm0246

Crease

- When the JG crease motor [A] rotates counterclockwise, the crease motor [B] operates.



Number of Fold Operations

You can change the strength of the fold by changing the number of times that the crease roller mechanism presses the paper to make the fold. To do this, use SP6-315-001.

SP No.	Name	[Min to Max/Init./Step]
6-315-001	Set Number of Creasing	[0 to 4 / 1 / times] 0: -1 1: 0 2: 1 3: 2 4: 3

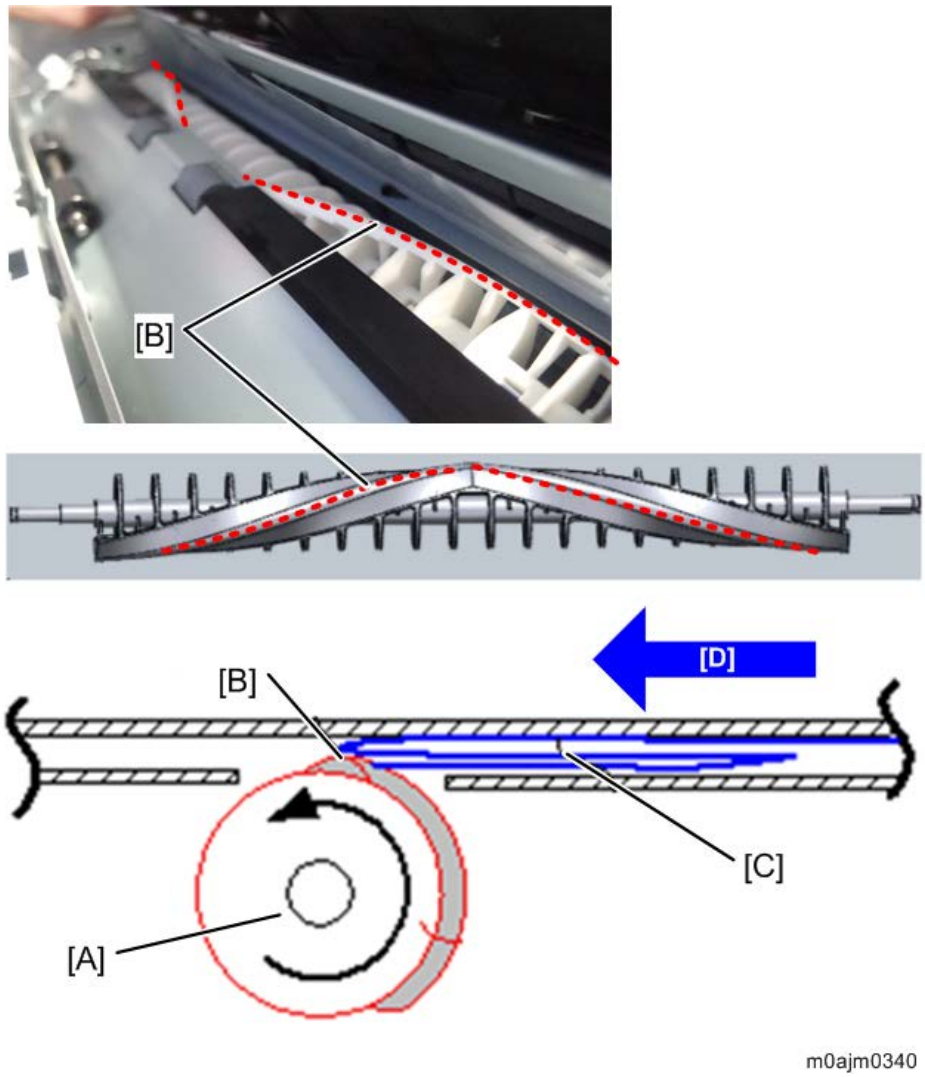
For each fold, you can specify the number of times that the mechanism presses the paper from 0 to 4.

As the default, the number of times is set to 1. You can change the number with this SP setting.

Note: If you set the SP value to 0 (-1), the number of times is set to 0.

If the number of times increases, the throughput decreases.

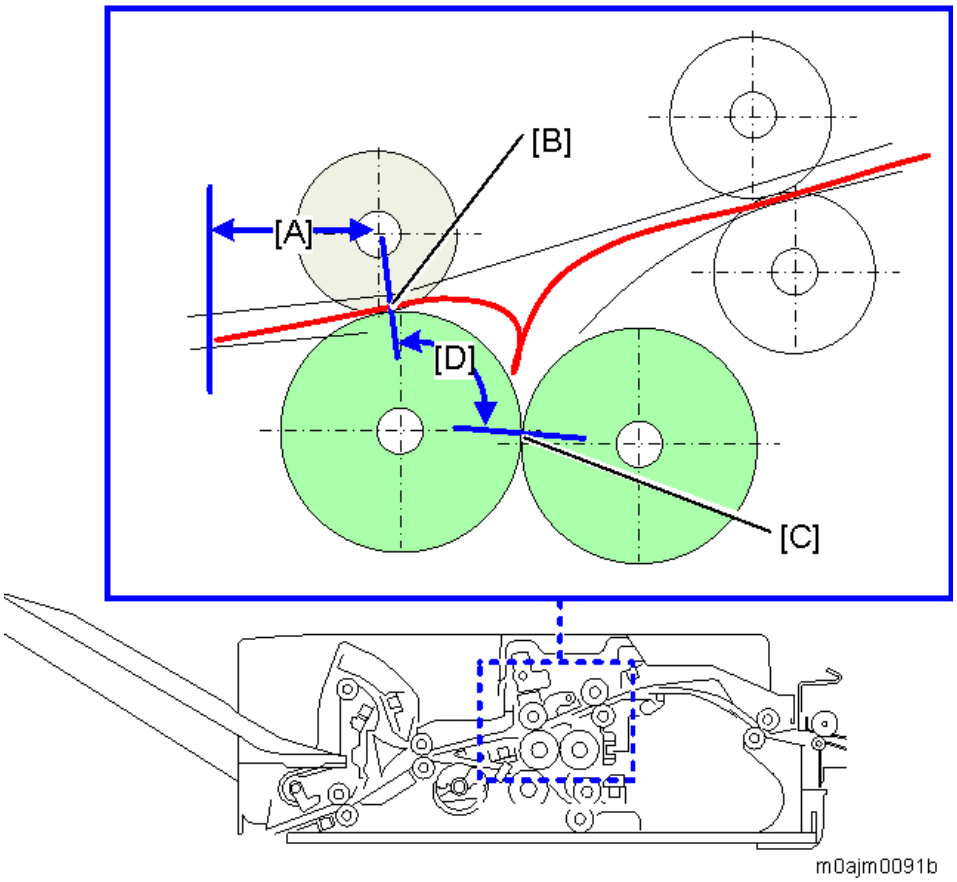
The internal multi-fold unit makes a crease fold by rotating the crease roller [A], which has a protrusion [B] as shown below, along the fold of the paper [C]. (Paper feed direction [D])



Folding Mechanism

By the bidirectional movement of the roller, the paper is fed to the fold position, and the paper stays in close contact with the roller when folding. This enables precise folding regardless of the characteristics of the paper. After feeding the paper to the 1st fold roller (F/R), the machine can control precisely where to stop the paper [A] by using a proportional-integral-differential (PID) controller.

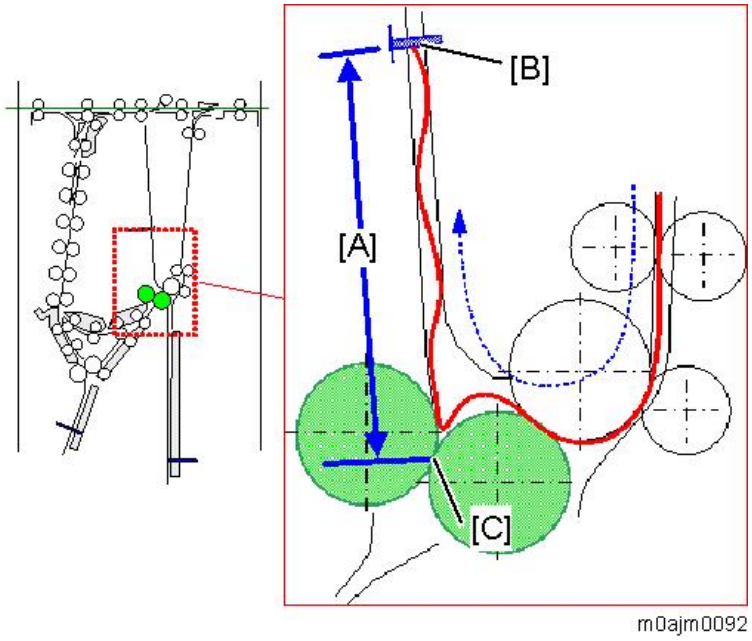
The distance [D] between the folding position [C] and the fold-assessment position [B] is short (about 30 mm regardless of the fold type or paper size). Furthermore, folding is performed with the paper in contact with the folding roller, preventing arching regardless of the paper curl, thickness, grain, and stiffness.



Note:

In the previous multi-fold unit, the folding position was determined by the stopper [B]. The distance [A] from the folding position [C] to the stopper is long (about 100 to 240 mm, depending on the fold type and paper size). Furthermore, the arch of the paper in the space to the stopper was influenced by the paper curl, thickness, grain, and stiffness.

Even if the stop position was accurate, the arch of the paper influenced the fold length.



Letter Fold-in / Letter Fold-out / Z-fold

[1] The leading edge of the paper passes the registration roller.

[2] The leading edge of the paper passes the 1st fold roller (F/R).

[3] When the paper is fed to the fold-assessment position, the 1st fold roller (F/R) reverses, forming an arch in the paper.

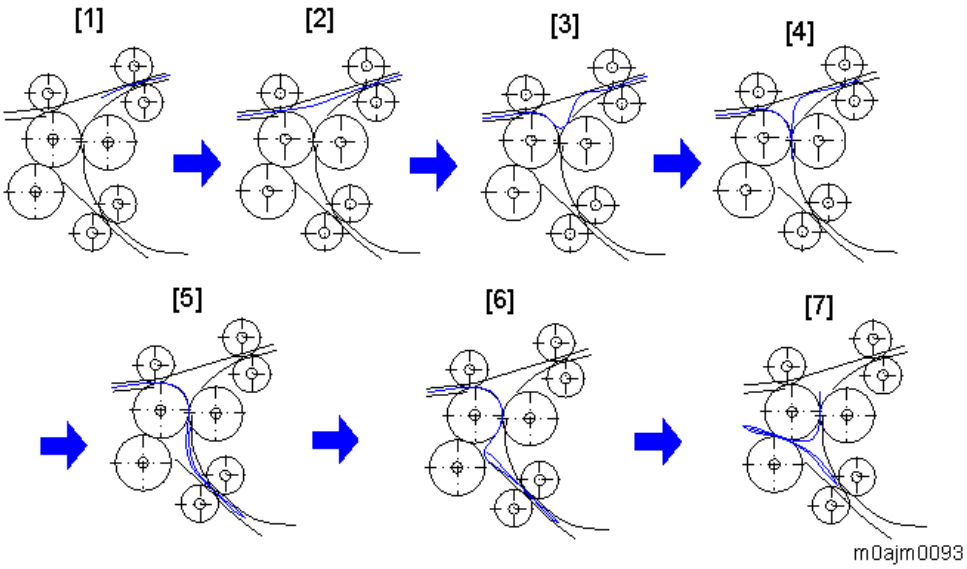
[4] When this arched part passes through the nips of the folding rollers 1 and 2, the first fold is performed.

[5] After the paper passes the folding roller, the 2nd fold roller pulls in the paper and feeds it to the 2nd fold position.

[6] At the fold position, the 2nd fold roller (F/R) rotates in reverse to form an arch in the paper.

[7] The 2nd fold is formed when this arched part is fed through the nips of the folding rollers 2 and 3. Depending on the difference in the fold positions, Letter Fold-In, Letter Fold-Out, or Z-Fold is performed.

The following diagrams show a Letter Fold-In example.



Half Fold

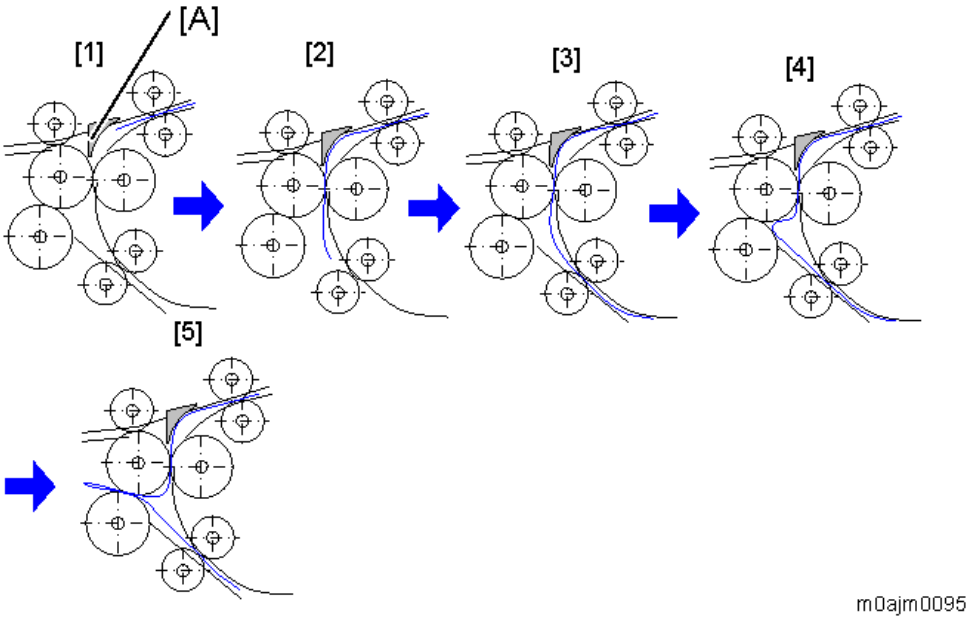
[1] The leading edge of the paper passes the registration roller.

[2] The paper is fed to the folding rollers 1 and 2 by the junction gate [A].

[3] The leading edge of the paper passes the 2nd fold roller (F/R) and is fed to the fold position.

[4] At the fold position, the 2nd fold roller (F/R) rotates in reverse to form an arch in the paper.

[5] The 2nd fold is formed when this arched part is fed through the nips of the folding rollers 2 and 3.


[A]
[1]
[2]
[3]
[4]
[5]
m0ajm0095